

Notes by Alexander Graham Bell, November 20, 1907

1907, November 20 Wednesday At Beinn Bhreagh.

(Dictated by A. G. B. to C. R. C. Copied from Home Notes p. 131 by C. R. C.).

Mr. Bedwin left North Sydney on Sunday (Nov. 17) and drove to the Little Bras D'or Bridge, where he was met by the Gauldrie and brought back to Baddeck. He made arrangements whereby he could hire a schooner at a moments notice to replace the "Ugly Duckling".

On Monday morning he visited me at the House boat and having learned of the results of Saturday's experiments with the "Ugly Duckling", he decided to try the effect of remodeling the "Ugly Duckling" before sending for a schooner. I can only remain here for a few days longer, and if we are to abandon the "Ugly Duckling" and substitute a schooner it would take so much time to remove her masts and standing gear and fit her for the experiments, that it is extremely doubtful whether any experiments could be made with the "Cygnnet" this season.

A bow was made on Monday for the "Ugly Duckling" which prevented the water from reaching the top of the protruding float, and this was carried up to make a higher bulwark, or water shield at the front part of the "Ugly Duckling".

The axis of the tilting-beam was carried as far to the stern as possible, so that when the men stand in front of the tilting-beam they would not be in the bow of the "Ugly Duckling" but more nearly amid-ships.

These improvements were made so that the "Ugly Duckling" could be tested again Tuesday (Nov. 19). The "Ugly Duckling" 2 was anchored in the Bay, and when the steamer Blue Hill arrived the tow rope was placed on board, and she started to tow the "Ugly Duckling" up the Bay towards Baddeck. The additions to the "Ugly Duckling" have

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considerably increased her weight, but she trims much better on the water. She was towed up and down the Bay at half speed and at full speed with her full complement of men upon her. The water shield in front proved to be sufficient to keep her deck quite dry, and although she was slightly depressed at the bow, there was none of that alarming depression which frightened the men in former experiments. They now feel confidence in her stability and do not anticipate an upset. We have all come to the conclusion that it will be better to use the "Ugly Duckling" for the proposed experiments with the "Cygnet" as it is obvious that a schooner, or another structure, means postponment of the experiments until next year.

Another bank of cells has been put together having the general form of the "Cygnet", but of half the dimensions. It has 30 cells in the top layer, and is six cells deep; it is heavily beaded with a good bow protruding 1 meter in front of the kite. Its flying weight is 586 grams per square meter oblique.

EXPERIMENTS WITH CELLULOID .

Douglas McCurdy has succeeded in making an apparatus for generating hydrogen-gas which seems to work satisfactory. He made a small model float of celluloid supported within by a stout framework of wood with the edges rounded to prevent cutting the celluloid.

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The bottom of the float was left open, the corners were covered with liquid celluloid, which upon drying seemed to be thoroughly water-proof. Before filling the float with hydrogen-gas he unfortunately subjected the celluloid of the float to considerable and unnecessary strain. First by pushing the whole float filled with air completely under water, and second by lifting the float (Full of water) out of the barrel in which the experiments were made. On Monday afternoon (Nov. 18) he filled the floats with water and holding it under water with the open mouth down he displaced the water inside the float with hydrogen-gas. The float

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was fastened in a barrel of water so that the water level inside was about 15 centimeters below the level of the water outside. The pressure of the contained gas causing a slight bulging of the celluloid surface.

Yesterday afternoon (Tuesday, Nov. 19) the water level inside the float was substantially the same as the water level outside, showing that hydrogen had leaked out. We cannot accept this as proof that hydrogen-gas can penetrate celluloid as the rough usage to which the float had been previously subjected may have caused a minute leak somewhere. We pushed the float down another 20 centimeters yesterday leaving it with the water level inside about 20 centimeters lower than the level outside, and will examine it again this afternoon. In the same barrel with the celluloid float Douglas McCurdy had a glass bottle filled with hydrogen (a Poland water bottle). This was placed there (Upside down of course in the water) on Monday (Nov. 18) and yesterday (Tuesday Nov. 19) the bottle was completely full of hydrogen so that there was no leak there, and no absorption of any of the gaseous contents by the water in the barrel. The bottle was immersed upside down with the mouth open, so that there was contact between the water of the barrel and the hydrogen in the bottle.

This control experiment showed that the water level in the celluloid float had risen on account of leakage and not on account of absorption by the water of the barrel. There was either a leak in the float in the form of an orifice through which the gas escaped, or the gas had leaked through the substance of the celluloid itself. In order to settle this important point two other floats were made yesterday, or rather started (Tuesday Nov. 19).

First a brick-shaped piece of wood the sharp cutting edges rounded off was covered with celluloid film and the junctions rendered water-tight with celluloid cement. Difficulty however was experienced in withdrawing the wooden block which stuck to the celluloid, so that the celluloid was torn in the process. The wooden block was then coated with paraffine wax at the corners and covered with celluloid which was left to harden all night. It is expected that the removal of block will be facilitated by melting the paraffine

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wax by water warm enough to melt the wax and yet not hot enough to hurt the celluloid. Douglas McCurdy tried the effect of coating the corner of the wooden block with paraffine, in consequence of another experiment made 5 and suggested by me, which was as follows:

At my request Douglas McCurdy yesterday (Nov. 19) dipped a paraffine candle into a solution of celluloid in celluloid cement, then hung up the candle to dry. In this way a thin film of celluloid will be formed on the candle. To-day he will dip it again, and after drying will dip a third and fourth time, or as many times as may be necessary to produce a good stout covering of celluloid without any seam in it. The whole thing will then be placed in water warm enough to melt the surface of the candle, so that it can be withdrawn leaving a sort of test-tube of celluloid. The bottom of the candle was rounded off as shown in the above drawing before the experiment commenced. Should we succeed in producing a seamless test-tube of celluloid we propose to immerse it in water, and while full of water turn it upside down, and then displace the water inside with hydrogen-gas.

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The open mouth will be placed in a clamp supporting a weight sufficient to sink the whole thing in a jar of water. It will then be left for observation. This experiment is to test whether hydrogen can escape through the substance of the celluloid. As there are no seams, there can be no leak excepting through the substance.

CELLULOID BALLOON .

Mr. McNeil has been making preparations for the construction of a pear-shaped celluloid balloon 2.5 meters in diameter and 3.75 meters long.

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He has constructed a wooden frame on which to hang the celluloid during the process of manufacture, and has made a model of the whole balloon of Brown paper, the sections of which will guide him in cutting out the celluloid sections into proper form.